

New Zealand Society of Animal Production online archive

This paper is from the New Zealand Society for Animal Production online archive. NZSAP holds a regular annual conference in June or July each year for the presentation of technical and applied topics in animal production. NZSAP plays an important role as a forum fostering research in all areas of animal production including production systems, nutrition, meat science, animal welfare, wool science, animal breeding and genetics.

An invitation is extended to all those involved in the field of animal production to apply for membership of the New Zealand Society of Animal Production at our website www.nzsap.org.nz

[View All Proceedings](#)

[Next Conference](#)

[Join NZSAP](#)

The New Zealand Society of Animal Production in publishing the conference proceedings is engaged in disseminating information, not rendering professional advice or services. The views expressed herein do not necessarily represent the views of the New Zealand Society of Animal Production and the New Zealand Society of Animal Production expressly disclaims any form of liability with respect to anything done or omitted to be done in reliance upon the contents of these proceedings.

This work is licensed under a [Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License](http://creativecommons.org/licenses/by-nc-nd/4.0/).



You are free to:

Share— copy and redistribute the material in any medium or format

Under the following terms:

Attribution — You must give [appropriate credit](#), provide a link to the license, and [indicate if changes were made](#). You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.

NonCommercial — You may not use the material for [commercial purposes](#).

NoDerivatives — If you [remix, transform, or build upon](#) the material, you may not distribute the modified material.

<http://creativecommons.org.nz/licences/licences-explained/>

Differences between P and Y export lamb carcass grades in *M. longissimus dorsi* area and shape

A. H. KIRTON

Ruakura Animal Research Station, Hamilton

ABSTRACT

Data on *M. longissimus dorsi* (LD) area, width and depth were examined on 1957 lamb carcasses graded for export as either P (moderate to heavy fat cover) or Y (light fat cover) over 3 slaughter seasons. Lambs were sired by 1 of 11 different breeds mated to Romney ewes. Carcasses in the 2 grades differed in mean weight and LD measurements in the different seasons. After adjustment for differences in carcass weight and the effects of sire breed, LD area did not differ between the P and the Y grades. After adjusting the A (width) and B (depth) measurements for differences in carcass weight and sire breed, P grade LD's were significantly narrower and deeper than those from the Y grade, but the differences were small (maximum of 5% for depth in 1970/1 season) and of little practical significance. Thus if the leaner Y grade carcasses are desired, and this is done on a within breed basis, the LD area or shape should not be adversely affected provided carcass weights are not reduced.

INTRODUCTION

In recent years around 90% of all export lamb carcasses have graded P or Y (Anon., 1980). Kemp and Barton (1966) sampled various export grade carcasses and showed that the Prime grades (combined into the P grade in 1967/8) had bigger LD area and depth measurements than Y carcasses. This has led to the suggestion that lean Y grade carcasses are less desirable than P grade carcasses because deficiencies in LD area and shape result in less eye appeal when Y cuts are displayed. In the Kemp and Barton (1966) experiment, the carcasses came from unknown breeds and the P carcasses were heavier than the Y carcasses within weight ranges. The present experiment looks at the influence of carcass fatness, as reflected by the P or Y grades (Kirton and Jury, 1970), on the size and shape of the LD muscle after allowing for differences due to ram breed and carcass weight.

MATERIALS AND METHODS

Carcass data from the 1970/1, 1971/2 and 1972/3 seasons of the Ruakura progeny trial (Carter and Kirton, 1975) were examined. Rams of the Romney, Southdown, Poll Dorset, English Leicester, Ryeland, Merino, Dorset Horn, Suffolk and Hampshire breeds mated to Romney ewes in single sire mating groups produced 1957 lambs with carcasses grading P or Y recorded for sire breed and hot carcass weight (HCW). Approximately 50% of the lambs each year were Southdown cross. LD area, width and depth (measurements, A and B respectively, Palsson, 1939) and fat depth C were measured on the cut anterior surface of the loin separated at the last rib. The ether-extract content of the left side of each carcass was determined.

RESULTS AND DISCUSSION

The 1021 carcasses grading P averaged 13.9 kg HCW, 2.55 mm fat cover at C and 30.0% carcass ether-extract. The 936 carcasses grading Y averaged 11.8 kg HCW, 1.33 mm fat at C and 23.9% carcass ether-extract. Differences in these measurements between grades were similar each season. The range of carcass weights in each of the 2 grades was similar within each season, being over 6 kg in all cases.

Mean LD areas for the P and Y grades in each season are shown in Table 1 together with differences after adjustment for sire breed, HCW and both sire breed and HCW. Although there were differences ($P < 0.001$) between sire breeds in the mean LD area of their progeny (both unadjusted and at the same HCW) the adjustment of the grade LD area means for disproportionate breed representation resulted in little change in the grade means. In contrast, adjustment for HCW differences markedly reduced mean differences in LD area between the P and Y grades because HCW and LD areas were strongly related in these data and the grades differed in mean HCW in the unadjusted data. Y grade carcasses are on average lighter than P grade carcasses in any population (e.g., Kirton and Jury, 1970).

After adjusting grade LD area means for differences in both HCW and sire breed, the P and Y grade LD area means were, for, practical purposes, the same. Fatter carcasses did not have larger LD areas.

The effect of fat cover (grade) on width and depth of the LD muscle was similar in all seasons so results for the 1971/2 season, involving most carcasses, are given in Table 2. LD width differed little between grades in the unadjusted data and adjusting for sire breed had little effect on grade means. However,

TABLE 1 Contribution of sire breed and HCW (kg) to differences in LD area (cm²) between carcasses graded P or Y for export.

	Mean LD area		P - Y	(P-Y) 100 P	Sig. of diff.	SE diff.
	P	Y				
1970/1 (n = 477)						
Unadjusted	8.45	7.29	1.16		***	0.116
Adjusted for breed	8.06	7.10	0.96		***	0.123
HCW	8.00	7.55	0.45		***	0.129
breed + HCW	7.61	7.42	0.19	2%	+	0.129
1971/2 (n = 743)						
Unadjusted	8.65	7.35	1.30		***	0.090
Adjusted for breed	8.52	7.29	1.23		***	0.090
HCW	8.26	7.94	0.32		***	0.084
breed + HCW	7.87	7.81	0.06	1%	ns	0.084
1972/3 (n = 737)						
Unadjusted	8.71	7.55	1.16		***	0.097
Adjusted for breed	8.58	7.55	1.03		***	0.097
HCW	8.32	8.06	0.26		***	0.084
breed + HCW	8.00	7.94	0.06	1%	ns	0.090

+ = $P < 0.10$

comparing LD width between grades for carcasses of the same weight showed the Y carcasses had slightly wider LD's and adjusting for both sire breed and HCW increased this further to the extent of being 3% wider than measurement A in P grade carcasses. In 1970/1 A was 2% wider in Y grade carcasses ($P < 0.05$) and in 1972/3 A was 4% wider in the Y grade carcasses ($P < 0.001$) after adjusting for both sire breed and HCW. Such small differences would not be expected to influence consumer purchasing decisions.

Table 2 shows that although measurement B was 11% smaller in Y carcasses compared to P carcasses in the unadjusted data, this difference was reduced to 3% smaller after adjustment for sire breed and HCW. Weight adjustment gave most reduction. For 1970/1, B was 5% less in the Y grade compared to the P ($P < 0.001$) and for 1972/3, B was 2% smaller in the Y carcasses ($P < 0.01$). Once again, consumers

would not be expected to pick such differences in similar weight carcasses especially as there is no difference in LD area between the 2 grades.

These results show that LD area and shape was strongly affected by HCW and sire breed. However, when these variables were compared between P and Y export carcasses of the same weight and adjusted for sire breed the LD differences were either absent or were proportionately very small. If small LD areas in some carcasses are regarded as a problem by the meat trade, the best solution is to encourage farmers to produce heavier carcasses. For markets requiring leaner carcasses LD cross section should not be adversely affected irrespective of whether such leaner carcasses are produced from within breed selection or from other management procedures, provided HCW is not reduced. Although this paper provides no genetic information to justify the above statement, because the carcass is a 3 component system, if the

TABLE 2 Contribution of sire breed and HCW (kg) to differences in LD width and depth (mm) in 743 carcasses graded P or Y for export in 1971/2.

	Grade		P - Y	(P-Y) 100 P	Sig. of diff.	SE diff.
	P	Y				
Width (A)						
Unadjusted	47.4	47.0	0.4		+	0.24
Adjusted for breed	47.1	46.9	0.2		ns	0.24
HCW	46.7	47.9	-1.2		***	0.25
breed + HCW	46.1	47.7	-1.6	2%	***	0.26
Depth (B)						
Unadjusted	26.6	23.6	3.0		***	0.19
Adjusted for breed	26.2	23.4	2.8		***	0.19
HCW	25.9	24.6	1.3		***	0.18
breed + HCW	25.1	24.3	0.8	3%	***	0.19

+ = $P < 0.10$

weight of one major component (fat) is decreased, the other 2 (muscle and bone) must increase in weight provided HCW is not decreased. Botkin (1974) reported generally negative genetic correlations between LD area and measures of carcass fatness in sheep indicating that selection for leanness should not adversely affect LD area.

ACKNOWLEDGEMENT

K. E. Jury for biometrical analyses.

REFERENCES

- Anon., 1980. New Zealand Meat Producers Board 58th Annual Report, Wellington.
- Botkin, M. P., 1974. *New Mex. Agr. Exp. Sta. Bull.* 616, p. 55.
- Carter, A. H.; Kirton, A. H., 1975. *Livest. Prod. Sci.*, 2: 157.
- Kemp, J. D.; Barton, R. A., 1966. *N.Z. Jl agric. Res.*, 9: 590.
- Kirton, A. H.; Jury, K. E., 1970. *Proc. N.Z. Soc. Anim. Prod.*, 30: 130.
- Palsson, H., 1939. *J. agric. Sci., Camb.*, 29: 544.